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June 8, 2011

Chairman Julius Genachowski  
Federal Communications Commission  
445 12th Street, SW  
Washington, D.C. 20554,

Dear Chairman Genachowski:

As you discuss issues related to the merger of AT&T and T-Mobile USA (WT 11-65), I would like to raise a few points about the importance of building wireless network capacity in light of the increase in mobile data traffic. While I am providing comments in my personal capacity as an economist, I would like to acknowledge AT&T's sponsorship of a related analysis of spectrum issues.

The usable frequencies in the spectrum have been determined, in part, by the evolution of mobile technologies developed so that you can make calls, use data features, and even watch video on your phone while not interfering with other radio-based services. Although new frequencies have been added to cell networks to accommodate the growing number of features of today's smartphones, the number of people using these phones has grown quickly, making the frequency spectrum increasingly crowded and leading to congestion on the network.

The special challenge is the increasing amount of data, for example the Youtube videos you watch on your phone, or other data uses from apps and web browsing. Mobile broadband technology created new possibilities for mobile use, but they also put strain on the network. The Cisco Visual Networking Index Global Mobile Data Forecast projects a compound annual growth rate of 92% for mobile data traffic between 2010 and 2015, amounting to a 26-fold increase. The Federal Communications Commission has found, that even within conservative estimates, the nation faces the prospect of a spectrum shortage by 2013.

There are basically three approaches to increasing mobile capacity: adding additional cell sites by splitting cells to increase frequency re-use, adding additional spectrum, and adopting new technologies to improve spectral efficiency. The adoption of LTE represents the most significant effort towards greater spectral efficiency in the long-term. But an immediate broad-reaching LTE conversion across the industry, would make a lot of currently-used phones obsolete, turning all but the most advanced cell phones into paperweights, and will raise consumer and public safety issues. The delays in licensing and building additional cell sites and the limitations of cell-splitting require solutions in addition to the building of additional infrastructure in the short-term to address today's capacity problems.

This leaves adding additional spectrum as an essential option in the short- to medium-term. We should not expect spectrum to be diverted from other uses in this time frame. The past delays in making new spectrum available for mobile services are illustrated in the table below taken from the FCC's recent broadband plan document. The delays ranged from six to 13 years. In addition, while these delays represent when the spectrum may have been available for auction, typically other delays, including construction timing, added an additional time lag.

Band	First Step	Available for Use	Approximate Time Lag
Cellular (Advanced Mobile Phone System)	1970	1981	11 years
PCS	1989	1995	6 years
Educational Broadband Service (EBS) Broadband Radio Service (BRS)	1996	2006	10 years
700 MHz	1996	2009	13 years
AWS-1	2000	2006	6 years

Others believe that problems with spectrum should be addressed by repurposing spectrum currently allocated for other uses. One way proposed to help address this problem is by reclaiming frequencies currently used by broadcast television and the government, and auctioning them for mobile wireless use. This is a sensible proposal in theory, though in practical terms it represents a fundamental long-term reorganization of the communications industry that will take years, if not a decade, to carry out. This proposal has already been met by significant opposition from the National Association of Broadcasters.

The proposed merger comes at a time when policymakers, carriers, and other stakeholders are trying to figure out how to best utilize spectrum and sustain a communications network that will most benefit the public. The decisions made around the merger will effectively decide what happens to T-Mobile's part of the spectrum and shape future approaches to spectrum allocation and spectrum exhaustion. Additionally, and because LTE will functionally change how spectrum is used, there are advantages to combining the spectrum of the two carriers.

T-Mobile customers will likely experience better coverage in many areas while, for AT&T customers, the merger would help to alleviate network congestion in major cities by creating a more efficient multi-frequency network. These benefits will become more important going forward, as 4G technologies are adopted. In particular, the merger will allow T-Mobile and AT&T to combine their AWS spectrum holdings and use this spectrum to offer LTE service without displacing their current 2G and 3G customers.

T-Mobile has already allocated all of its usable spectrum to 2G (GSM) and 3G (HSPA), technologies that are less spectrally efficient than 4G (LTE). Since T-Mobile has no spectrum outside of the two frequency bands in which it offers its GSM service (PCS-band) and its HSPA service (AWS-band), it lacks the spectrum resources to offer 4G. The only way T-Mobile could evolve to LTE is if it were to discontinue its GSM or HSPA services and re-purpose this freed spectrum to LTE. But such an expansion would be at the expense of its current subscribers who would need to purchase (or be provided with) entirely new phones if T-Mobile were to make the switch.

The combined demands for voice, data, video, etc., have led to an exponential increase in the need for capacity. Combining the AT&T and T-Mobile spectrum will enable the merged carrier to provide service to the existing GSM and 3G users while simultaneously making capacity available for the emerging 4G market. While T-Mobile has struggled to be successful and lacks the spectrum to move to 4G, it could successfully be integrated into a more comprehensive network.

Alternatively, someone else (e.g., Sprint) could acquire T-Mobile. But because Sprint uses a completely different kind of network standard, it is hard to envision an easy path to success for actually combining their infrastructures.

I hope you find this perspective useful as you consider these issues.

Sincerely,

A handwritten signature in cursive script, reading "Yale M. Braunstein".

Yale M. Braunstein  
Professor

CC:

Commissioner Meredith Attwell Baker  
Commissioner Mignon Clyburn  
Commissioner Michael Copps  
Commissioner Robert McDowell